

Teacher Background Information

Counting Calories SC070103

This lab is a simulation that provides reasonable data, but will not give precise calorie information because of the significant heat loss. Students can, however, get good *relative* data; that is, they will find that peanuts release more calories than bread. They can also compare foods with different fat contents to demonstrate that fat increases the calorie content of food.

They may have to relight the peanut several times. The freeze-dried versions burn best. Of course, this requires a class with reasonably good discipline. Matches can be a source of mischief if discipline is not maintained.

Encourage students to suggest alternative foods. Dried fruits have been successfully burned. You can get good relative data by comparing low fat Tostitos and Doritos. As students discuss which foods to choose, emphasize small pieces and low moisture. The idea that oxidation works best when the food is in small pieces can be extended to the idea of physical digestion.

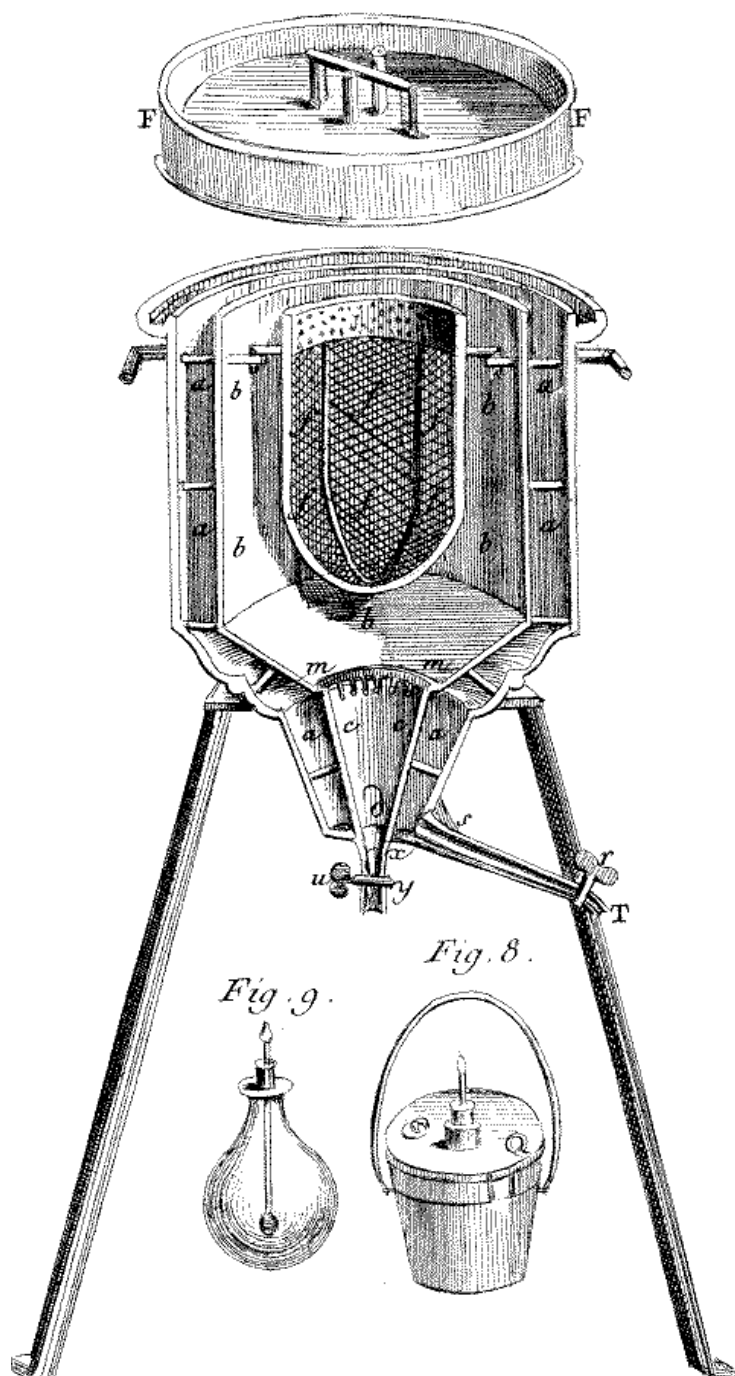
If you use marshmallows, you may want to do them last. Also, students may find that they have to mass the paper clip and the burned marshmallow, and then subtract out the weight of the paper clip because it will be covered with burned sugar.

Suggested Rubric for Assessment “Design a Better Calorimeter”

Level	Characteristic
0	Student does not indicate an understanding that a calorimeter is a chamber to hold heat.
1	Student draws a calorimeter essentially the same as the class experiment that holds heat but is not improved.
2	Student increases the thickness of the insulation or the number of layers to improve heat retention.
3	Student increases heat retention and increases airflow.
4	Student improves heat retention, airflow, and combustion of food.

Transparency Master

Here is the first calorimeter used by Lavoisier:



In 1872 Lavoisier and the young mathematician LaPlace tried to measure how much of the mystery element “caloric” was found in oil. How could people believe this idea? Why would they think that heat was an element and not energy?